Chapter 4

ANALYZING CENSUS DATA IN DIFFERENT GEOGRAPHIC AREAS

Introduction

C2020 software allows users to easily examine U.S. Census data in area geographic layers such as States, census tracts, cities (census places), and congressional districts. C2020 users can create their own defined area, save a map of that area, and then analyze the data that is inside the area. Users can also draw geographic bands of any width around any item in a map and then analyze data within the bands.

Problem Statement

The Planning Committee has just rejected a preliminary housing proposal for grant funding due to the lack of specific demographic information in the proposal. You just received C2020 software and want to create maps and data tables illustrating the neighborhood encompassing the housing project and the demographics for the neighborhood. How do you get started?

IN THIS CHAPTER

What You Will Learn in Chapter 4

- In Exercise 1 you will learn how to view census data within a county and then custom define a geographic area within a city.
- In Exercise 2 you will learn how to "trim" census data to view it in both tables and graphic illustrations for the custom-defined area created in Exercise 1.
- In Exercise 3 you will learn how to create a map showing only the area of your choice, without the surrounding areas. The exercise uses the city of Baltimore as the example to create a boundary layer of the city. Layers are then added to show information pertaining only to the city.
- In Exercise 4 you will learn how to create bands (buffers) around an item in your map and then use overlays to analyze demographic information within the bands.

Introduction to Exercise 1: Defining Your Community's Boundaries

C2020 enables users to view more than 600 census data elements (e.g., income, population, ethnicity, age, etc.) for any area layer, such as block groups, States, cities, counties, census tracts, and congressional districts. If the user wishes to obtain this data for a uniquely shaped neighborhood whose boundaries may cross borders of block groups, census tracts, or counties, then the user must complete additional steps using the software.

What You Will Learn in Exercise 1

In this exercise you will learn how to:

- View the census data for your county.
- Define a uniquely shaped neighborhood within your map window.
- Create a marker for this new area and add the new map to your map library.

Viewing Census Data for Your County

Steps

1. **Click on the Map Library button** in the HUD toolbox and make the following selections in the Map Library dialog box to open a map of Montgomery County, Maryland (or a county of your choice):
   - ***Location: Other Location*** (**Note:** You must select this option because Montgomery County is not one of your current markers.)
   - ***Category: General Purpose Maps***
   - ***Map: Road Map***
2. When the Find window appears, ***click on the County button,*** then ***type "Montgomery, MD"*** as the county name to open the county map.

   Now ***change the Working (Active) Layer to County (High Res)*** in the Working Layer window, as shown:

3. Next **click on the Info tool**  . The Info tool gives you access to a wealth of census data regarding any of the visible map layers. **Click on any county on the map** to obtain census data on that county. **Click on another county** and the data for this county will replace the data for the previous county. Next **change the working layer to another visible layer** (interstate highway, for example). While the Info tool remains active, **click on an interstate highway**

to access data regarding that interstate highway. When you are finished using the Info tool, **close the window** that contains the information you obtained by clicking on the hyphen character in the top left corner of this window, and then ***select Close*** from the menu that appears.

Using the Select by Pointing Tool

4. You can also access census data for any map layer by using the **Select by Pointing tool**  . To obtain data for a county using this tool, **make County (High Res) the working layer.** Next **click on the Select by Pointing tool**  and then **click anywhere on the map in a county of your choice** (to select multiple counties, hold the shift key down while selecting). The selected county(ies) should turn red. **Now click on the New Dataview tool**  in the main toolbar. A table will appear listing census data for all counties in the Eastern region. Because you want to see the data only for Montgomery County (or for all the counties you selected), ***click on Selection*** in the Working Layer window. The contents of the table will change and you will see census data for only the selected county(ies).

Defining a Uniquely Shaped Neighborhood Within Your Map Window

It is easy to use the **New Dataview tool**  to obtain census data for defined geographic regions, such as counties, census tracts, block groups, census places, congressional districts, etc. If you wish to obtain census data for a geographic region that the U.S. Census does not recognize, however, such as a uniquely shaped neighborhood bounded by streets of your own choice, you must perform additional steps.

5. **Click on the Map Library button**  and make the following selections in the Map Library dialog box:

   Location: My Neighborhood

   Category: General Purpose Maps

   Map: Road Map

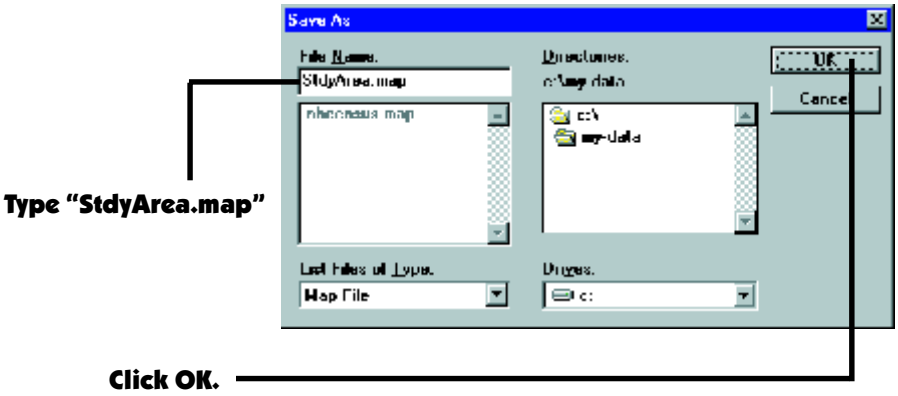
   Click OK.

Click on the Pan tool  . Now **click on the map and push it upward** until only the lower third of Druid Lake appears in the map, as shown below. If you have a different map, use the Pan tool to move your map slightly in any direction to a new location.

Saving a Copy of the Road Map

Maps from the Map Library cannot be deleted or modified. Next you will save a copy of the Road Map from the CD-ROM to the computer's hard drive so you can modify it by drawing geographic boundaries of your choice on it.

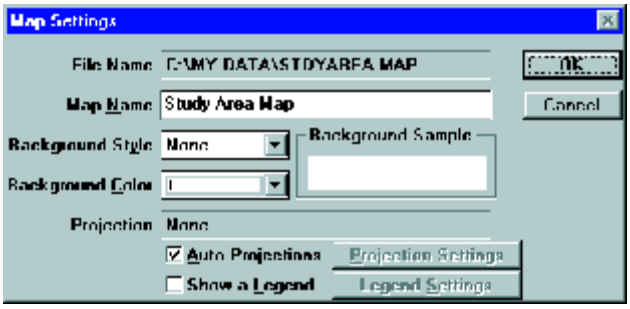
6. ***Choose File, Save As, from the Main Menu***. The Save As dialog box will appear. ***Save the map under the name "StdyArea.map",*** as shown below.



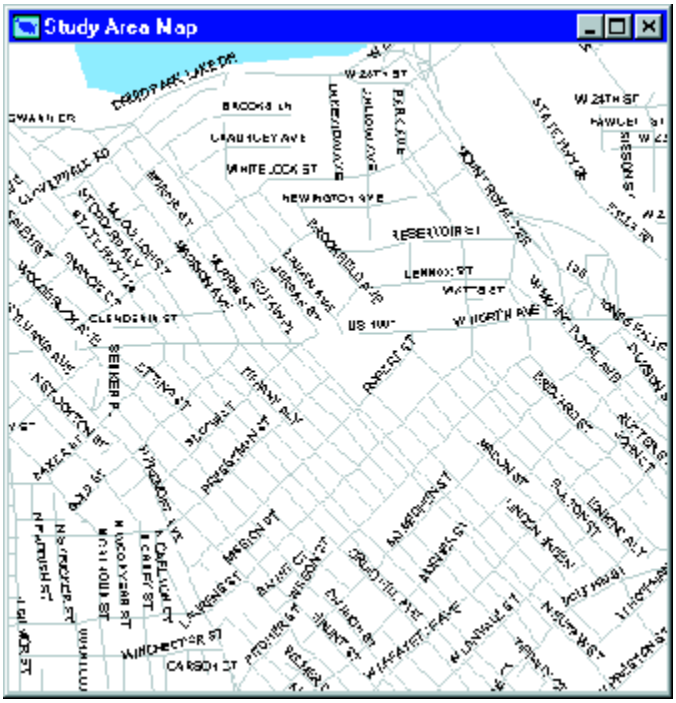
Changing the Name in the Title Bar

Notice that your map window's title bar still reads "Road Map" in the upper left corner. C2020 allows you to give a different name to this map window.

7. To do this, ***click on Map, Settings from the Main Menu.*** The Map Settings dialog box appears. ***Change the Map Name to "Study Area Map,"*** as shown below:



Your map should now look like this:



TIP

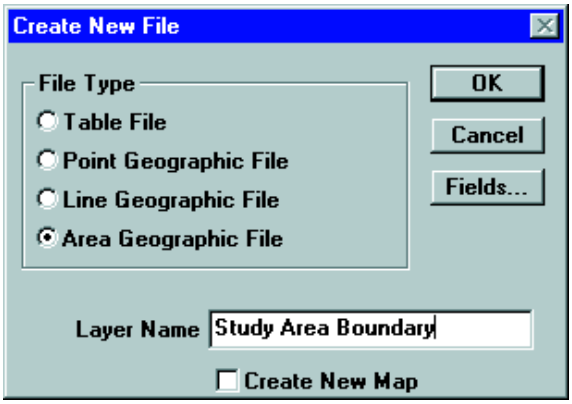
Do you find yourself resetting the legend position each time you open the same map? Here are some legend preferences you can set:

- *To move the legend out of the map window,* ***select the Pointer tool*** *on the main toolbox,* ***double-click on the legend,*** *and* ***select Separate Window*** *from the pulldown menu in the Legend dialog box. To set other parameters,* ***click on the Legend Settings button.***

Creating a new Layer

Now you want to create a border for your uniquely shaped neighborhood on the map, but you cannot draw the boundary directly in any of the layers currently on your map because they are each saved onto the CD-ROM. You must create a blank layer, place it on the map, and then draw the boundary in it. First, therefore, you will create a new layer in the Study Area Map.

8. To do this, ***click on File, New, from the Main Menu.*** The Create New File dialog box appears, as shown in the following illustration. To create a new layer that will cover geographic areas, ***click on the button corresponding to Area Geographic File and type "Study Area Boundary"*** in the Layer Name window. Then ***click OK.***



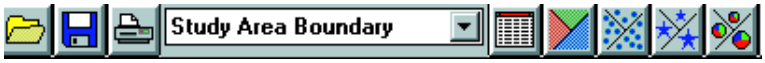
9. The Save As dialog box will appear. ***Save the file in your own directory with a name*** (no more than 8 characters) ***such as "StdyArea"*** or another name of your choice.

   A new, blank layer called *Study Area Boundary* (but stored in the c:\my-data subdirectory as "StdyArea.dbd") is now part of your Study Area Map.

Defining Your Neighborhood Boundary

Your next step will be to define your custom area by drawing its boundaries in the new map layer. As with any action on a map layer, you must first make sure that the layer you are going to change is the working layer.

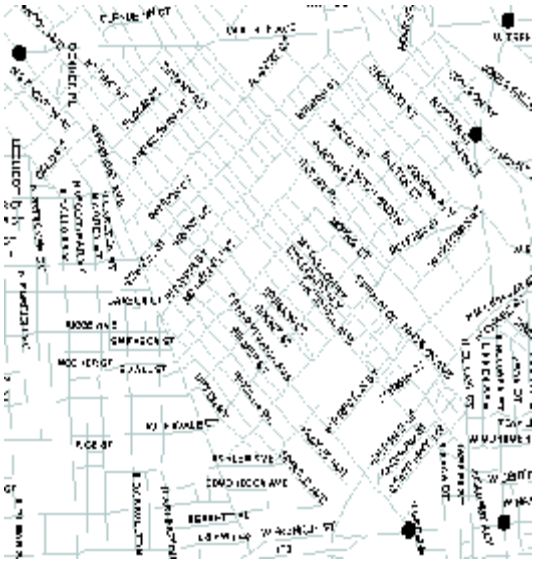
10. ***Click on Study Area Boundary*** from the Working Layer window, as shown below:



11. **Hide the legend by clicking on the Show/Hide Legend tool**  .

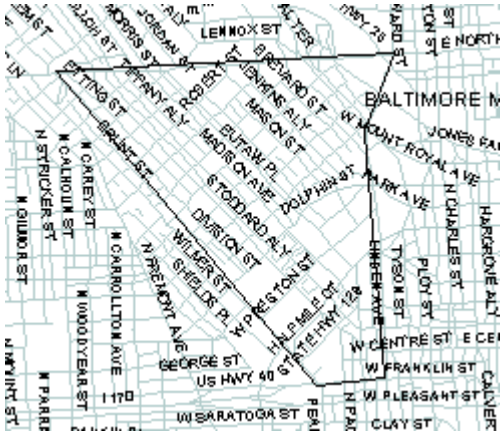
12. ***Click on Tools, Map Editing,*** from the Main Menu. The Map Editing toolbox will appear, as shown below. You may wish to move this toolbox up on the screen. To do this, **click with your cursor on any part of the dark blue bar in which "Map Editing" appears, then drag the toolbox to an uncluttered area of the screen.**

13. **Look at your map and mentally select a region** around which you would like to draw a border. This region will be your Study Area. To draw the border, **click on the Add Area button**  . **Draw a polygon around your study area by clicking on several points, as indicated below. When you have finished tracing around the polygon, double-click directly on the first point you used to start the polygon.** This will close the polygon. (**Note:** if you are working with a map that has a different marker, just be sure to create a large enclosed shape with at least three points.)



14. **Click on the Save Edits button**  on the Map Editing toolbox.

The polygon you have drawn is now a defined area in the Study Area Boundary map layer. The map will be redrawn with more visible boundaries, as shown below:



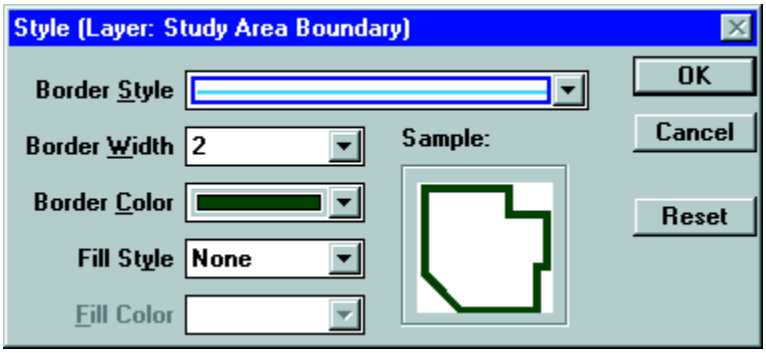
If the polygon does not appear as shown above, you probably did not close it successfully. If this is the case, repeat steps 13 and 14.

Troubleshooting Tip

Upon completing your polygon (see illustration at right), the street names appear in light blue. If you make a mistake while outlining your polygon and wish to start over, **press the Escape key, then begin again.**

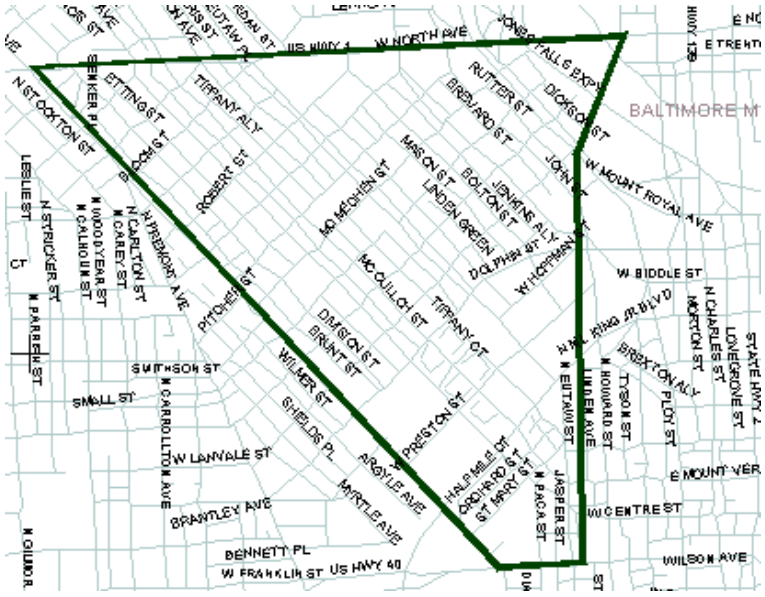
Changing the Boundary Style

15. The Study Area Boundary is difficult to see at this point because it consists of only a very thin line. Make this boundary line easier to see. In the Working Layer window, ***make Study Area Boundary the working layer.*** Next, **click on the Layer Style button**  on the Main Toolbar. The Layer Style dialog box will appear. **Make the following selections or ones of your choice:**



Click OK.

Your map will be redrawn and should now resemble the illustration below:



Save Your Work

16. **Click on the Save File button**  on the Main Toolbar or ***Choose File, Save,*** from the Main Menu to save your map.

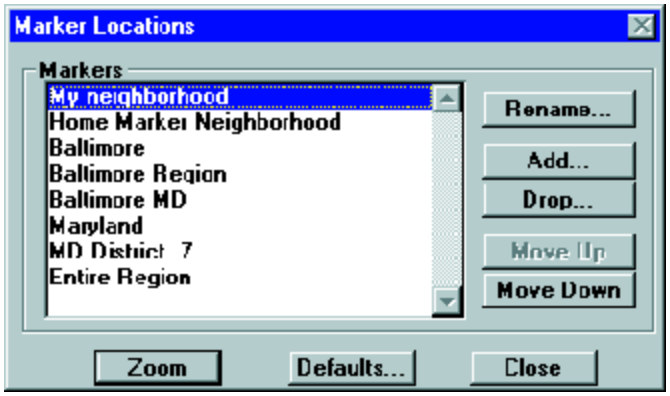
Creating a Marker for the Study Area

Remember that a marker is a map view setting of location and scale (magnification) for any map. The list of current markers is accessible by **clicking on the Markers tool**  in the HUD toolbox or by ***choosing HUD, Markers,*** from the

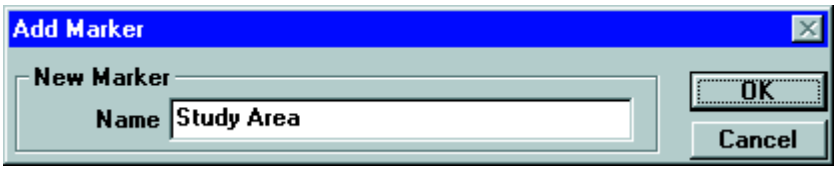
Main Menu. The location of the map window that contains the Study Area is slightly south of My Neighborhood. (Remember, you began with a map using My Neighborhood as the marker and then moved the map slightly using the Pan tool.) The Study Area is in a location different from the My Neighborhood marker and you may wish to save a marker for the geographic region applicable to the Study Area.

17. **Click on the Markers tool** or ***click on HUD, Markers.***

18. The Marker Locations dialog box appears. ***Click on the Add button.***



19. The Add Marker dialog box appears. ***Enter "Study Area"*** for the name of your new marker in the Name field, then ***click OK.***



20. When you return to the Marker Locations dialog box, **click on the marker you just added.** You will be selecting the Study Area frequently when making future maps, so ***move the marker to the top of the list by clicking on the Move Up button*** until it reaches the top of the list. Then ***click on Close.***

Saving the Study Area Map Into a New Map Category

21. Click on the **HUD Map Library tool** . The top pane of the HUD Map Library window now contains Study Area as a marker. The middle pane lists map categories. If you use C2020 software extensively, you will create many of your own maps. It will be helpful to store them in categories. Create a category of maps now and give this category the name "My Maps."

    While the HUD Map Library window is open, **click on the Content button** at the bottom of the window. When the Configure Map Library window appears, ***click on the upper-right Add button.*** The Add a New Category window appears.

Type the new category name "My Maps." ***Click OK.*** The Configure Map Library window appears and illustrates that you have successfully added this new category of maps to the library. You can now use this open window to add a specific map to the My Maps category, as described below.

Adding the Study Area Map to the My Maps Category

To add a specific saved map, such as the Study Area map, to the My Maps category, ***click on the lower Add button*** in the Configure Map Library window. You need to tell the computer where you stored the Study Area map. ***Click on the c:\ drive and then double-click on the my-data subdirectory to open it.*** You should see this subdirectory's files listed in the left part of this window. ***Click once on StdyArea.map*** to highlight it, then ***click OK*** (or simply double-click on StdyArea.map).

C2020 attaches the generic name New Map to this map in the Configure Map Library window. You may wish to replace this generic name with a more descriptive one, such as "Study Area Map." To do this, ***click with your cursor on the name New Map,*** delete this name, then type in the alternative name. Then ***click OK.*** Next ***click on Yes in the Confirm window*** to indicate that you would like this change to be made to the map library. Now you will return to the HUD Map Library window. The Study Area map has been added to the Map Library under the name Study Area Map in the category My Maps.

Introduction to Exercise 2: Displaying Community Statistics

C2020 can create maps showing demographic information—for example, the number of unemployed people in each block group of your community. The software also includes a simple and powerful tool—the Dataview Statistics tool—that you can use to aggregate information from all the map areas (e.g., block groups) that make up a community. For example, if one of your map layers shows unemployment data by block group, you could use the Dataview Statistics tool to find the sum of unemployed people in *all* the block groups within your community. You could also find the average level of unemployment per block group, the maximum number of unemployed people in any one block group, or a variety of other statistics.

This information is most straightforward when your community is a predefined geographic area, such as an entire county. But with the tools and techniques demonstrated in this chapter, you can even tailor your statistical queries to your own customized areas.

What You Will Learn in Exercise 2

In this exercise you will find an estimate of the number of children under 5 years of age and below the poverty level in the Study Area created in exercise 1. To arrive at this goal, you will learn how to:

- Use the Select by Pointing tool to select block groups in the Study Area.
- Create a geographic file of these selected block groups.
- Use Map Editing tools to trim off block groups of areas that lie beyond the boundary of the Study Area.
- Display a table, or "dataview," of statistics for the Study Area.
- Display a thematic map illustrating census data for the Study Area.

Adding the Block Group Layer to the Study Area Map

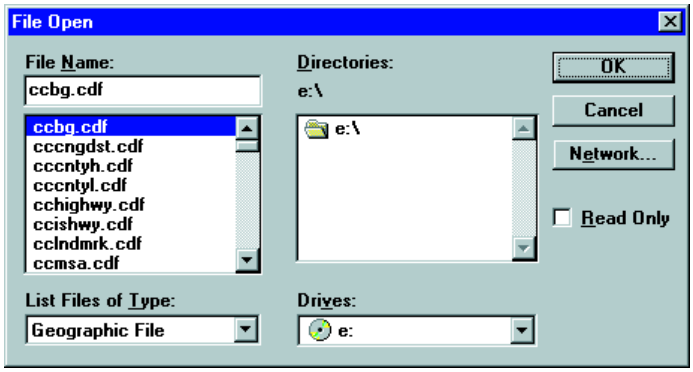
1. The software contains census data for each area geographic layer stored on the CD-ROM (each census place, state, block group, census tract, congressional district, etc.). The Study Area is a customized area layer you created by selecting boundaries of your choice. The CD-ROM does not, therefore, contain census data specifically for this area. To obtain census data for this customized area, you must obtain data from a geographic layer whose boundaries are recognized by the U.S. Census Bureau and which covers the same geographic territory as the Study Area. In this exercise you will do this by using the Block Group layer. (Typically, block groups contain 150 to 200 housing units.) You will examine census data for those block groups that occupy the same territory

as the Study Area. Later you will total this data. This will give you an estimate of the U.S. Census data applicable to the Study Area.

2. Begin this exercise by adding the layer containing block groups to the map. To do this, **click on the Map Layers button** on the main toolbar or ***choose Map, Layers.***

3. The Layers dialog box will appear. ***Click on the Add Layer button*** in the dialog box. The File Open dialog box appears.

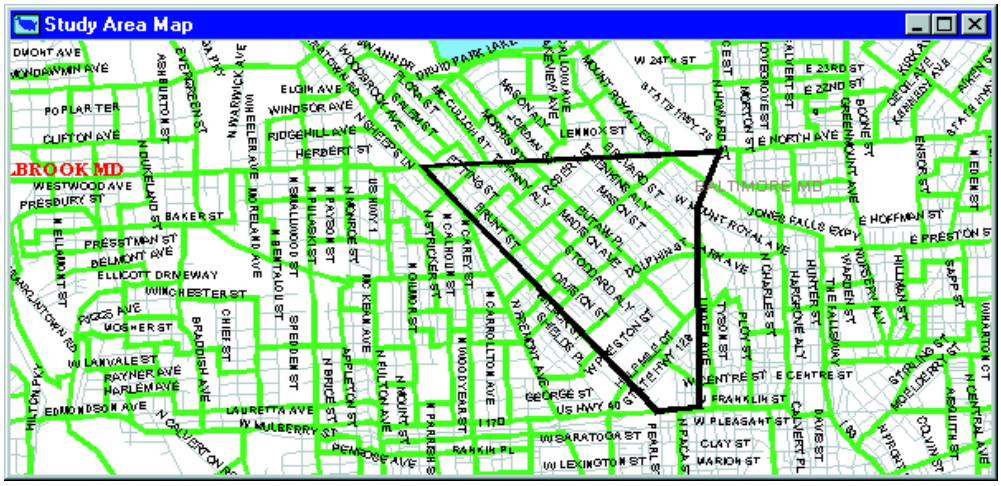
4. The block group layer is in a file called "ccbg.cdf." To locate this file, **choose the drive containing your CD-ROM,** then ***select "Geographic file"*** as the file type in the lower left corner. ***Click on the file "ccbg.cdf"*** to highlight it, then ***click OK.*** The File Open dialog box and the options you should select are illustrated below:



5. You are returned to the Layers dialog box. A new layer, *Block Group,* appears at the end of the list of layers in this dialog box. To make each block group highly visible on the map, change the width and color of the boundaries of the block groups. You learned in chapter 2 how to change the style of a layer by using the Layer Style tool. Now you will use a new method of changing the style of the block group layer. While the Layers dialog box is open, ***click on the Block Group layer*** in the list to highlight it. Next ***click on the Style button. Change the border width to 2 points,*** **select a color that contrasts with your Study Area polygon,** then ***click OK.*** When you return to the Layers dialog box, ***click on Close.*** Your map will be redrawn.

   If you cannot see the outline of the Study Area when the map is redrawn, the block groups may be covering the Study Area. You learned in chapter 2 to correct this problem by rearranging the order of the map layers. To do that now, **click on the Map Layers button**. The layer at the end of the list is on top of the stack of map layers. To make the Study Area layer more visible, **click on it** with your mouse and then **click on the Move Down button** until the Study Area is at the bottom of the list. Now ***close the Layers dialog box.***

Your map window should now resemble the following illustration:

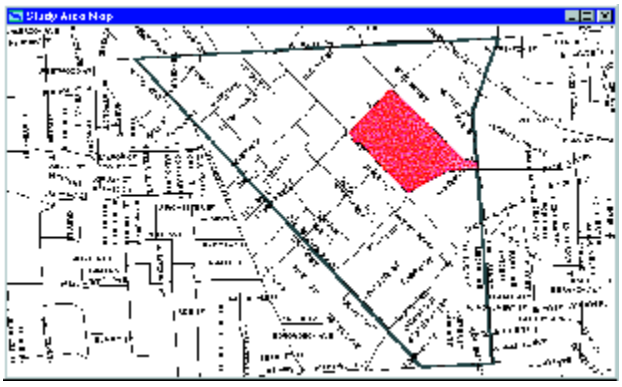


Selecting Block Groups in the Study Area

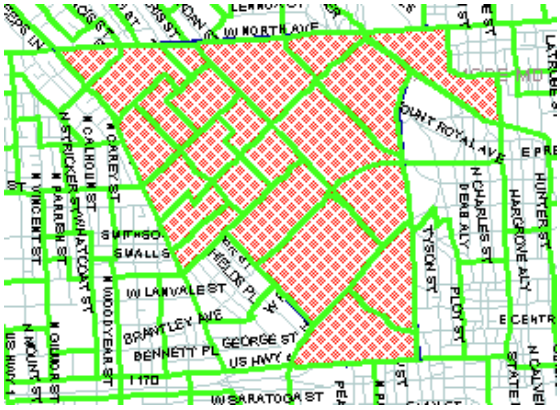
6. You have just added to your map a layer that contains every Block Group throughout the Eastern region of the United States. To focus only on Block Groups inside the Study Area, you can select each of them using the Select by Pointing tool. First, ***select Block Group*** as the working layer in the Working Layer window, as illustrated below:

Next click on the Select by Pointing tool  .

7. **Click once in any Block Group** inside the Study Area. The chosen Block Group will turn red, as illustrated below:



8. While holding down the Shift key, **click once in every block group that lies entirely or partly inside the Study Area boundary.** (Part of a selected block group may lie outside the Study Area.) When you are finished, your map window should show a shaded region as in the following illustration:



If it is necessary to deselect one block group, hold down the **Ctrl key and, with the Select by Pointing tool activated, click on that block group. To deselect all the selected block groups, click on the Clear Selection tool**  . After deselecting one or more block groups, certain map areas may be discolored. To fix this, redraw the map by **clicking on Window, Redraw,** from the Main Menu.

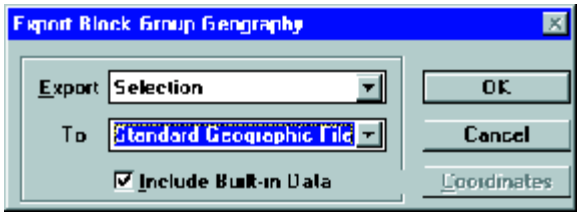
TIP

Two other tools allow you to select multiple objects in different ways: the Select by Circle tool  *and the Select-by-Shape tool*  .

Saving the Selected Block Groups as a Geographic File

9. Now that you have selected the block groups that encompass the Study Area, you must save this collection of block groups as a geographic file (i.e., a layer) that you will edit later. Whenever you wish to save a map object that you highlight using one of the selection tools, you must do so by *exporting* the selected item(s). To do that now, ***click on Tools, Export,*** from the Main Menu. The Export Block Group Geography dialog box will appear. **Make the choices indicated below.**

Click OK.



In the dialog box above, you wish to export only the selected block groups, not every one on the entire layer. Export the block groups as a Standard Geographic File, not a Compact Digital File. You can edit a layer after exporting it

only if you save it as a standard geographic file. Because you will edit this layer later, you must save it as a file of this type. It is critical to check the box next to Include Built-in Data. If you do not check this box, you will lose the U.S. Census data from each block group during the export process.

10. The Save As dialog box appears. In the upper left corner, ***type a new file name with eight characters or fewer, such as "Blkgrps."*** Be sure to ***select the c:\ drive*** in the lower right corner and be sure to ***select the my-data*** subdirectory. When ready, ***click OK.***

Adding the Study Area Block Groups Map Layer

11. Now that you have saved the block groups that are essential to this exercise into a separate file, you no longer need the Block Group layer on the map, since this layer contains every block group throughout the entire Eastern region of the U.S. You can drop this layer from the map and then add to the map the layer that contains only that small set of block groups that you saved above. To drop the regionwide block group layer, **click on the Map Layers button**  on the Main Toolbar. ***Click on Block Group*** to highlight this layer. Next ***click on the Drop Layer button. Do not close the Layers dialog box.***

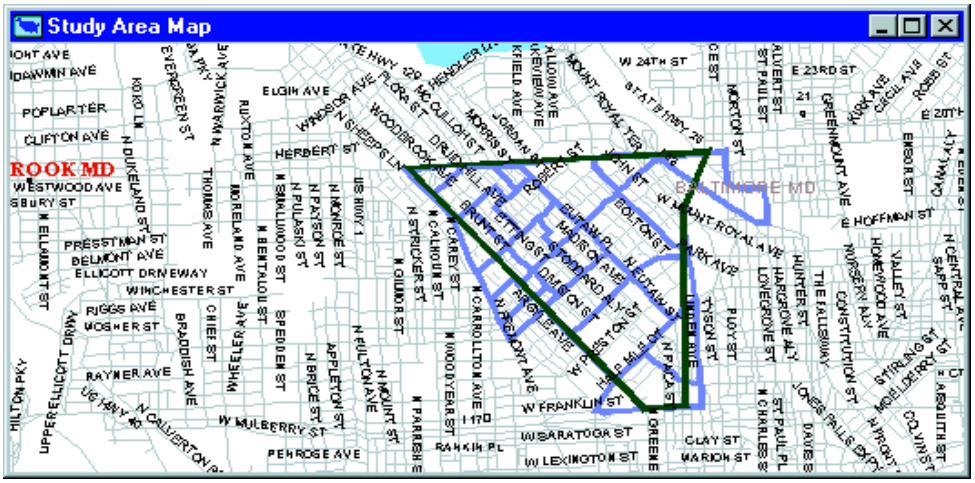
12. While still in the Layers dialog box, ***click on the Add Layer button.***

13. The File Open dialog box will appear. To open the file (layer) you saved in step 10 above and add it to the map, ***select geographic file as the file type and Blkgrps.dbd as the file name.*** Remember, this file is in the my-data subdirectory on the c:\ drive. ***Click OK.***

    The Layers dialog box will appear. Scroll to the end of the list of layers and you will see the generic name *Block Group* given to this layer. To rename it, **click on this layer in the list to highlight it.** Next ***click on the Rename button.*** In the space provided, type in the new name "Study Area Block Groups," then ***click OK.*** (Remember, the new name will appear only in the list of layers. The file name for this layer in the my-data subdirectory will not change.) Do not close the Layers dialog box.

14. Make sure Study Area Block Groups is the highlighted layer in the list (click on it to highlight it if necessary). ***Click on the Style button*** in the Layers dialog box. **Change the width and color** of the border to make the block groups more visible. When finished, ***click OK*** and you will return to the Layers dialog box.

15. ***Click on Close.*** Your Study Area Map will be redrawn and should resemble the illustration below:

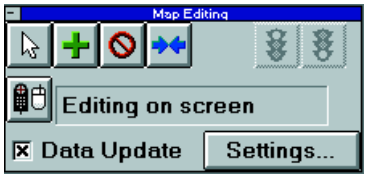


16. At this point, you need the Study Area Boundary layer to be completely visible on the map. If it appears to be hidden by the Block Groups layer, then rearrange the layers now by **clicking first on the Map Layers button**  **.** Scroll down the list of layers to find Study Area Boundary. If it is not the last layer, click on the layer to highlight it, then ***click on the Move Down button*** enough times to move this layer to the end of the list. When done, **close the Layers dialog box.** The map will be redrawn and the Study Area Boundary layer will be clearly visible on the map.

Trimming the Study Area Block Groups

In the map above, portions of certain block groups extend beyond the boundary of the Study Area. You can remove these outside portions to examine census data for only those portions of the block groups inside the Study Area. In the following steps you will trim off the parts of block groups that extend past the Study Area boundary. To do this, you will use the Add Area map editing tool  .

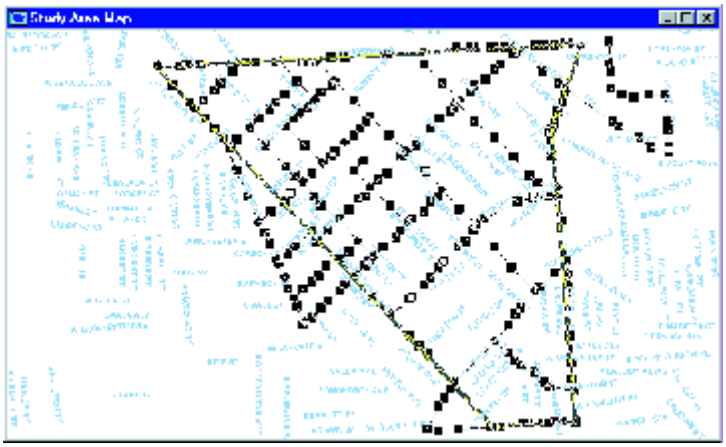
17. ***Click on Tools, Map Editing,*** from the Main Menu.



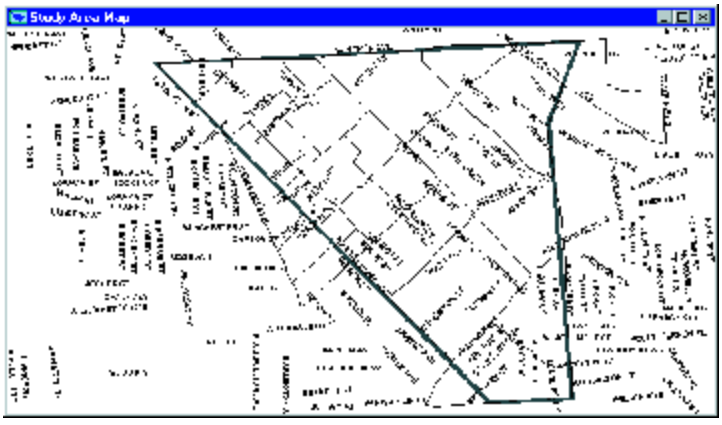
18. The Map Editing toolbox appears. You will use the Add Area tool  directly on the layer that contains the selected block groups. **Make Study Area Block Groups the working layer.** The working layer window should appear as follows in the main toolbar:

19. Now you can modify the Study Area Block Groups layer. While this layer is the working layer, and while you can see the outline of the Study Area on your map, you can use the Add Area tool to trace around the boundary of the Study Area. In doing this you will add new boundary lines onto the Study Area Block Groups layer. These boundary lines will separate the parts of the block groups outside the Study Area from parts inside the Study Area. ***Make sure the Data Update check box is checked.*** **Click on the Add Area tool**  **. Click once on one corner of the Study Area.** (Remember, however, that you are actually clicking on the Study Area Block Groups layer, since this is the working layer!) **Next move around the Study Area and click once on each corner. Then, double-click when you return to the original point.**

20. When you have finished, your map should resemble the illustration below:



Dots appear throughout the block groups to indicate that you are currently editing this layer. **Click on the green traffic light**  **now to accept your edits.** If you need to redo the previous step, **click on the red traffic light to cancel your edits.** When you click on the green light, the dots on the block group boundaries will disappear and your map window should look like the following illustration:

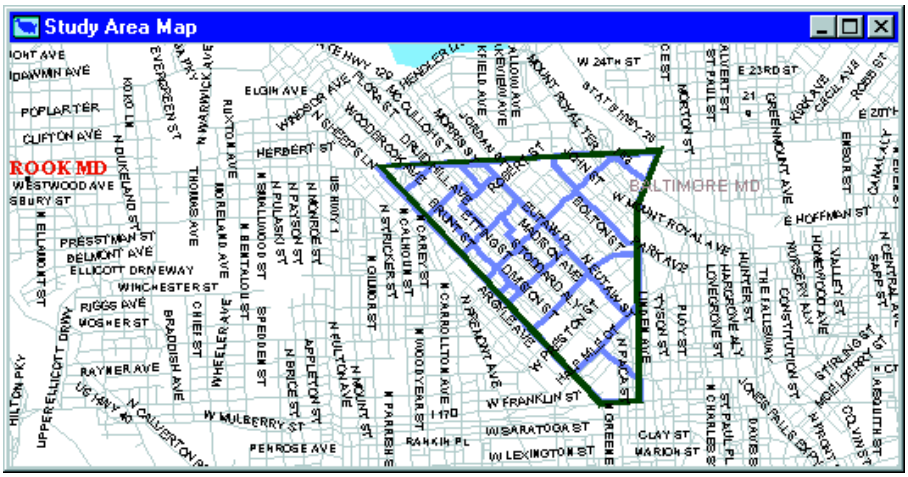


21. It may not be apparent within the map, but you have successfully added new boundaries to the Study Area Block Groups layer. These new boundaries divide

the set of block groups into two parts: one part consists of block groups and portions of block groups that lie inside the Study Area; the second part consists of parts of block groups that lie outside the Study Area. Next you will remove the parts of the block groups that lie outside these boundaries and keep only those parts that lie inside the boundaries. **Click on the Delete Area tool** from the Map Editing toolbox. ***Make sure the Data Update check box is checked.***

22. **Click on the part of each block group that is outside the Study Area.** You do not have to hold down the shift key to choose more than one area at a time to delete.

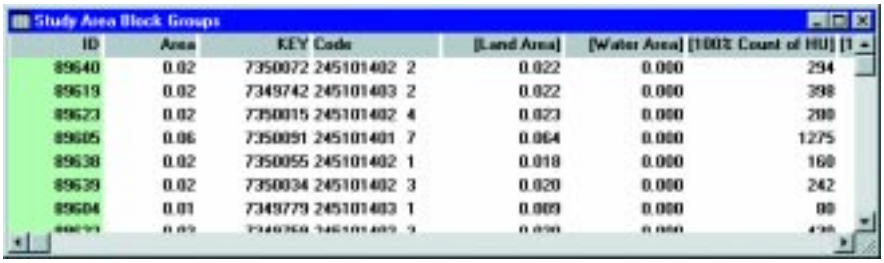
    When you click on an area to be deleted, you will notice that the boundary color of each selected area changes to red. Click on the green light to accept the deletions of these areas. Your revised map should look like this:



You have successfully trimmed off those portions of block groups that lie outside the Study Area. The whole and partial block groups inside the Study Area contain U.S. Census Bureau data. When you trimmed certain block groups, C2020 *adjusted* the census data in proportion to how much geographic area was trimmed. For example, if 63 percent of a block group was outside the Study Area when you trimmed it off, C2020 adjusted downward by 63 percent all census data for the remaining portion inside the Study Area. The software performs these estimates when you trim off portions of geography, so it is important to do exercises like these while using layers that have small geographic areas, such as block groups.

23. Your goal is to determine the approximate number of children under age 5 and below the poverty level inside the Study Area. Since you have assembled a set of block groups that match the shape of the Study Area and since each of these block groups contains U.S. Census Bureau data, you are now able to reach your goal. To view census data for these block groups, first ***make Study Area Block Groups the working layer*** in the Working Layer menu.

24. Next ***click on the New Dataview button***  on the main toolbar. A Study Area Block Groups dataview will appear, as shown below. Each row in the dataview corresponds to one block group or portion of a block group in the *Study Area Block Groups* layer you created.

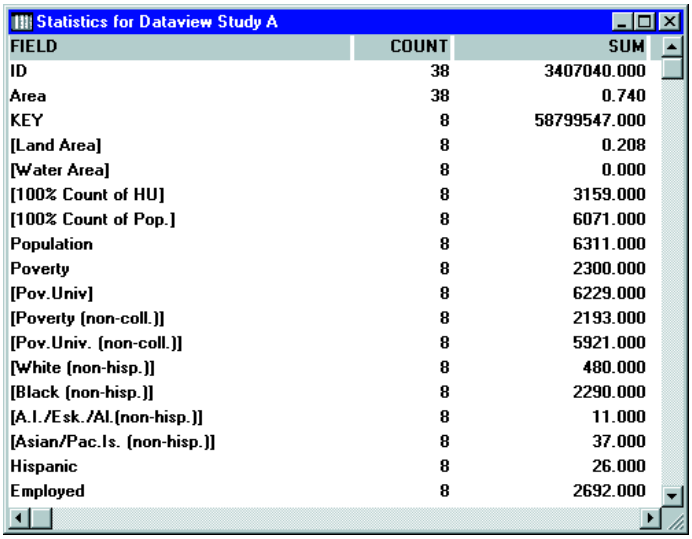


Each column contains a different piece of information about the area, such as each block group's land area in square miles, age and population information, the income levels of citizens in each block group, and other demographic information. There are more than 600 columns of census data information.

25. Next you will display the statistics of the block groups in your study area dataview. This will help determine the totals for all the block groups in the Study Area. To do this**, *select Dataview, Statistics,*** from the Main Menu. This opens the Save Statistics Table As dialog box. The software is preparing to create a database for you. You must give this database a name and storage location on your computer. ***Assign a file name such as "blkgrps.dbf"*** to the database file and ***save it onto the c:\ drive in the my-data subdirectory.*** When done, ***click OK.***

A new dataview window will appear, as illustrated below, with a name such as "Statistics for Dataview Study Area Block Groups":

This is the statistics dataview of the block groups and portions of block groups in the Study Area. This statistics dataview has one row for each category of information and a column for each of the different statistics (sum, average, etc.).

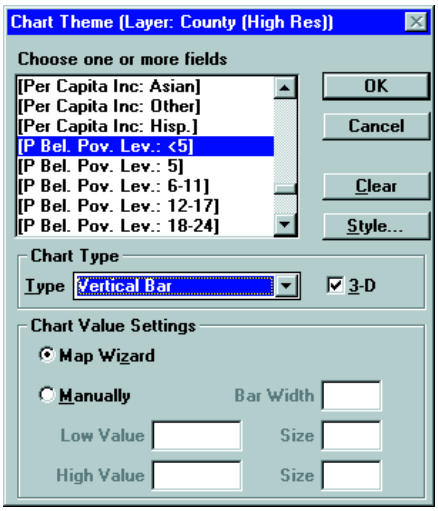


26. **Scroll more than three-quarters of the way down this list** using the vertical scroll bar on the right to find the field "[P Bel. Pov. Lev.: <5]." This is the number of persons below the poverty level who are under 5 years of age. The third column, with the heading "SUM," shows the total number of children under age 5 in the Study Area who are living in poverty.

Illustrating Themes in the Study Area Using Map Wizard Tools

27. C2020 includes tools to illustrate map themes. You can use the **Chart Theme Map Wizard**  , for example, to illustrate the number of children under 5 years of age and below the poverty level per block group within the Study Area. To do this, ***return to your map by clicking on Window, Study Area Map,*** from the Main Menu. Make sure you are in the Study Area Block Group working layer. Then **click on the Chart Theme Map Wizard**  . A menu will appear from which you can make selections for creating a thematic map.

    Make the selections illustrated as follows:



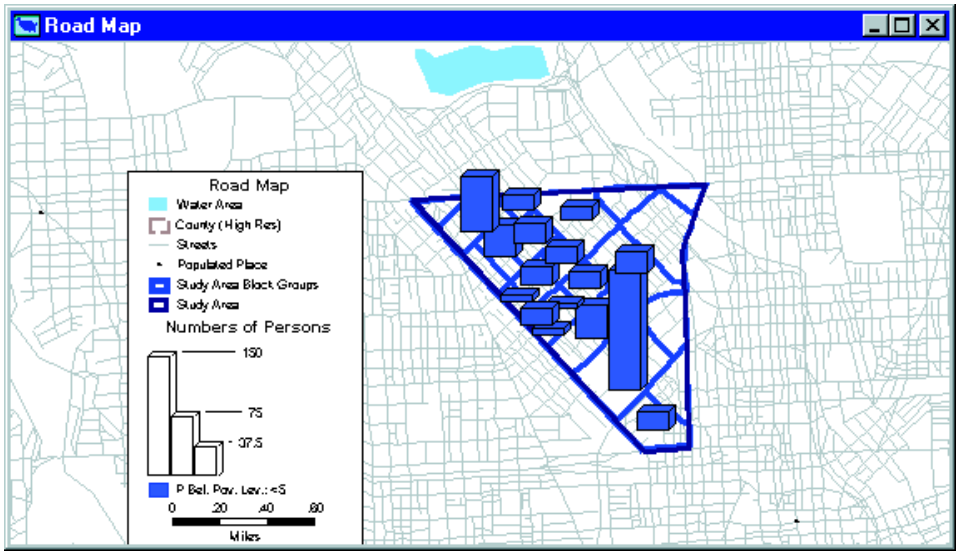
Choose the field "P Bel. Pov. Lev.:<5" and Vertical Bar as the Chart Type. In this exercise you are allowing the Map Wizard to establish chart defaults, but you can make your own selections by clicking on the button next

TIP

The Dot Density Theme Map Wizard  allows you to illustrate multiple census data fields in a thematic map.

The Scaled Symbol Theme Map Wizard  allows you to illustrate varying levels of a specific census data element. You can also use this tool to create your field, give it a name, and illustrate it in a map.

to Manually. You will have three-dimensional bars and, if you choose to, you can make additional changes by clicking on the Style button. When finished, ***click OK*** and your thematic map will appear, similar to the one below:



(**Note:** You may choose to clear labels for certain layers and change legend settings using the techniques learned in chapters 2 and 3.)

28. Save map changes and close all.

Wrapping Up

In this exercise you learned a new way to apply some of the tools and techniques you learned in exercise 1: You added a layer to your map; selected a portion of the areas in that layer; and saved, or exported, the selection as a geographic file. Then you applied the file to your map as a layer. This is a simple but powerful technique with many applications. Use it whenever you need to display or analyze the information from a local subset of a map layer.

Then you edited the new map layer by cutting block groups to fit your Study Area so you could display dataview statistics and a thematic map adjusted for the Study Area. You have learned powerful techniques with many applications. You can use what you have learned to generate tailored data and statistics for your own community—without doing any math!

Introduction to Exercise 3: Displaying Only Your Community

Sometimes you will want to create maps that show only one jurisdiction (e.g., one city or one county) without showing any of the neighboring jurisdictions. You may want this to achieve a particular visual format that will allow the viewer to focus on only the relevant jurisdiction. It is also desirable if you need to make maps that take up only a minimal amount of computer memory. This may be necessary if you import a map into a word-processing document.

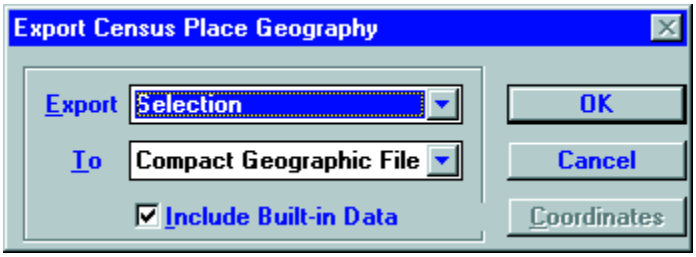
What You Will Learn in Exercise 3

In this exercise you will learn how to create a map that shows only the jurisdiction of your choice, without the surrounding jurisdictions. This builds on exercise 2. The exercise uses the city of Baltimore as the example to create a boundary layer of the city. Then layers are added to show information pertaining only to the city. To do this exercise, you will use the following tools and skills:

- Use the Select by Pointing tool to select the city boundary as a map layer.
- Add the layer from the CD-ROM that contains interstate highways and then select highways relevant only to Baltimore using Dataview, Select by Location and by using the Select by Pointing tool again.

Selecting the City Boundary as a Map Layer

1. In the Map Library, **make the following selections:**
   - ***Location to Display—Baltimore***
   - ***Category—General Purpose Maps***
   - ***Map—Area Map***
2. First make sure the working layer is Census Place (Census Place is the layer that contains census data for cities.) Next, **click on the Select by Pointing tool**  **and click anywhere inside the boundary of Baltimore city.** The Baltimore city area will be highlighted in red as the selected area.
3. To save this selected region as a layer, ***click on Tools, Export,*** on the Main Menu. The Export dialog box will appear. **Make the choices below** and ***click OK.***



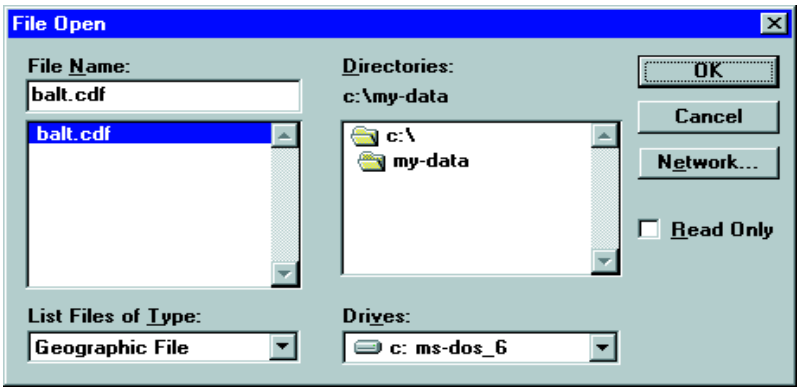
4. The Save As dialog box appears. ***Save the geographic file as "balt.cdf" into the c:\ drive, my-data subdirectory.***

5. Now that you have saved the selected city area as a geographic file, you will not need the original map because it contains layers covering the entire Eastern region and you are interested only in working with the map of Baltimore. ***Click on File, Close All,*** on the Main Menu. ***Select No*** in the Save Your Work dialog box.

Opening the Geographic File as a Map Layer

> **FYI**
>
> *Remember that there are two types of geographic files:*
>
> *Standard geographic files can be edited. Standard geographic file names end in ".dbd."*
>
> *Compact geographic files are small and display quickly, but cannot be edited. Compact geographic file names end in ".cdf."*

6. Now you will open the layer (geographic file) you just saved. This layer contains the geographic outline of the city of Baltimore. To do this, **click on the File Open button** on the Main Toolbar or ***click on File, Open.*** **Make the choices indicated below** and ***click OK.***



7. The file should look like this:

8. Change the name of this layer from "Census Place." To do this, **click on the Map Layers button** on the Main Toolbar. You will notice that the only layer, "Census Place," is highlighted. ***Click on Rename and type "Baltimore"*** into the text box provided and ***click OK.***

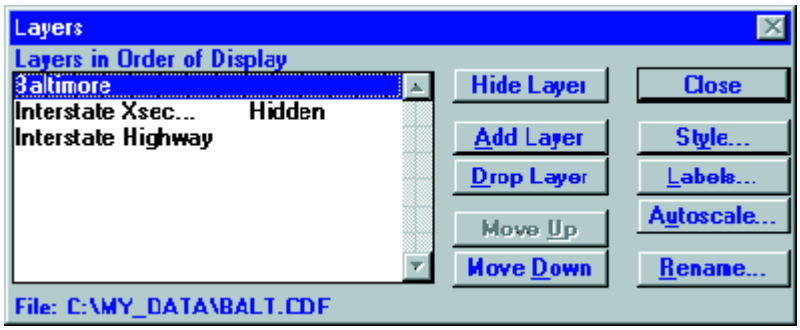
9. While still in the Layers dialog box, ***click on Style. Change the Fill Style from None to Solid.*** Then ***change the Fill Color to a pastel yellow*** (about two-thirds of the way down the list of colors) and ***click OK. Close the Layers dialog box.***

10. ***Choose File, Save As,*** on the Main Menu, and ***name the file "balt.map." Save the map onto the c:\ drive in the my-data subdirectory.***

Adding the Interstate Highways Layer to the Map

Now that you have saved the city area of Baltimore as a map, you will add the layer from the CD-ROM that contains interstate highways to your map.

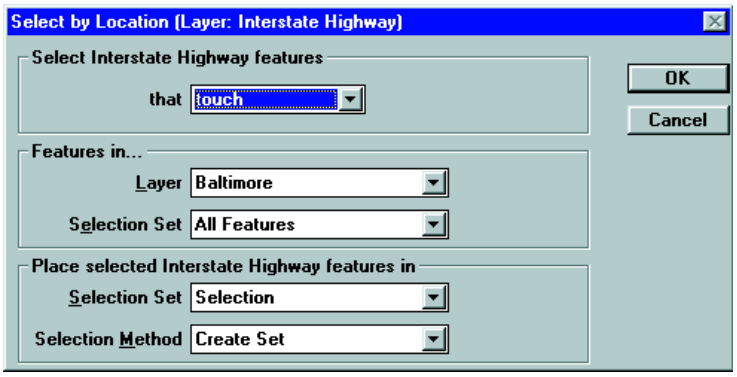
11. Click on the **Map Layers button**  on the main toolbar. ***Click on the Add Layer button.*** The File Open window will open. Be sure to choose the drive where your CD-ROM is located, then ***select ccishwy.cdf. Click OK.*** The Layers dialog box will return and should look like this:



The Interstate Highway layer has an additional hidden layer called "Interstate Xsec…," which always accompanies the Interstate Highway layer.

12. ***Click on the Close button*** to redraw your map with the Interstate Highways layer added.

13. To revise your map so that it shows only those interstate highways that touch the city of Baltimore, be sure that Interstate Highway is the working layer. ***Click on Dataview, Select by Location,*** from the Main Menu. The Select by Location dialog box will appear as shown in the following illustration:



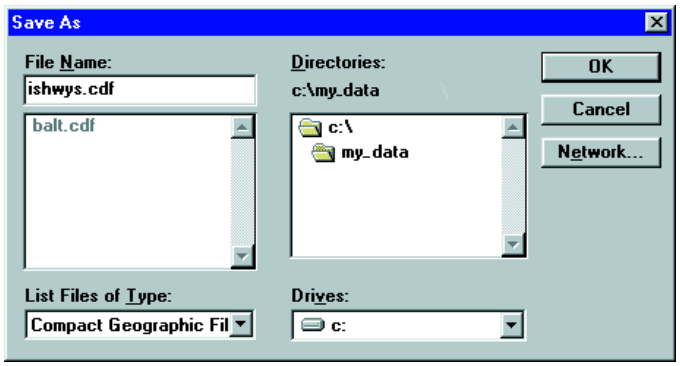
Make the choices indicated above. These choices indicate that you want to select all features in the Interstate Highways layer that touch the layer Baltimore. The computer will create a set of those interstate highways. ***Click OK.***

14. The interstate highways that touch the city of Baltimore will appear in red. Before proceeding, select a few more sections of interstate highways just outside the boundary of the city to add to your selection set. To do this, ***press down on the Shift key*** on your keyboard in order to not deselect the currently selected highways, then **click on the Select by Pointing tool**  **and click on a few more interstate highway segments of your choice** immediately outside the city's boundaries. These additional segments will also turn red.

Saving the Interstate Highways as a Geographic File

15. Now you must save the selected set of interstate highways. As you learned earlier, to save something chosen with a selection tool, such as the Select by Pointing Tool, you must use Tools, Export, from the Main Menu. To do this now, ***click on Tools, Export,*** from the Main Menu. The Export dialog box will appear. ***Save the selected interstate highways as a Compact Geographic File*** (which cannot be modified) and ***click in the small box to include built-in data. Click OK.***

16. The Save As dialog box will appear. **Make the choices indicated below,** then ***click OK.***



Adding the Interstate Highways Map Layer to the Map

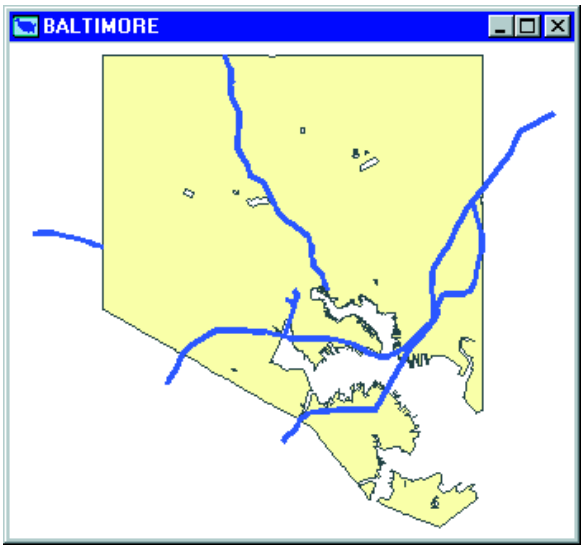
Now that you have saved the selected interstate highways as a geographic file, you will add the file to your map as a layer. Since you no longer need the current Interstate Highways layer on your map, you will drop that layer first.

17. Click on the **Map Layers button**  on the main toolbar. ***Select the layer Interstate Highways and click on the Drop Layer button.*** **Repeat this to drop the layer that contains interstate intersections.** Do not close the Layers dialog box.

18. Next, while still in the Layers dialog box, ***click on the Add Layer button.***

19. The File Open dialog box will appear. ***Select geographic file as the file type and open the file "ishwys.cdf"*** that you just created and saved into the my-data subdirectory. ***Click OK.*** Do not close the Layers dialog box.

20. ***Make sure the Interstate Highway layer is highlighted*** and ***click on the Style button*** in the Layers dialog box. ***Change the interstate highways to a dark blue or green color and select a pattern of your choice, select a width of 2–3, then click OK. Close the Layers dialog box to redraw your map.*** Your map should look similar to the following map:



21. ***Choose File, Save As, from the Main Menu. Save this map onto the c:\ drive in the my-data subdirectory under a name such as "balt.map."*** Do not close the map.

Introduction to Exercise 4: Creating Bands and Using Overlays

What You Will Learn in Exercise 4

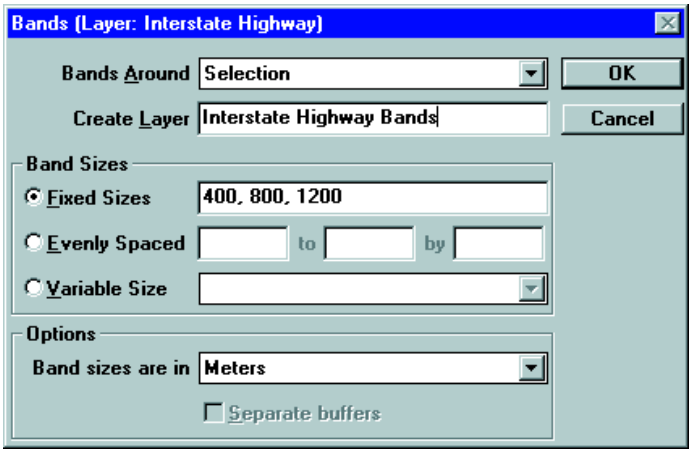
In this exercise you will learn how to:

- Create a band (buffer) around an item in the Baltimore map.
- Create an overlay to reveal demographic data within the band.

These features will help you if you need to analyze demographics within specific distances of points of interest, counties, sections of streets, etc. This is a common need for regional planning.

Creating a Band or Buffer

1. **Open the Baltimore map** (if you closed it) **from the previous exercise.** If you need to open it, remember that you saved it in the my-data subdirectory.
2. ***Make sure that Interstate Highways is the working layer.*** **Click on the Select by Pointing tool**  **and click on any part of any interstate highway inside Baltimore.** The part you clicked should turn red. Your goal will be to determine population and income levels immediately around the highway segment, based on U.S. Census Bureau data.
3. **Click on the Create Bands or Buffers tool**  **and make the following selections in the dialog box** to create three bands around the selected highway segment: one 400 meters around the segment; another 800 meters around the segment; and a third 1,200 meters around the segment. **Be sure to select meters as the unit** in the Options section at the bottom of the window.



4. ***Click OK.*** The Save As dialog box appears. C2020 is preparing to create a geographic file (layer) consisting of three bands around the selected interstate highway segment. You must indicate where you want the computer to store this file. ***Type in a file name of your choice, such as "bands.dbd," and store***

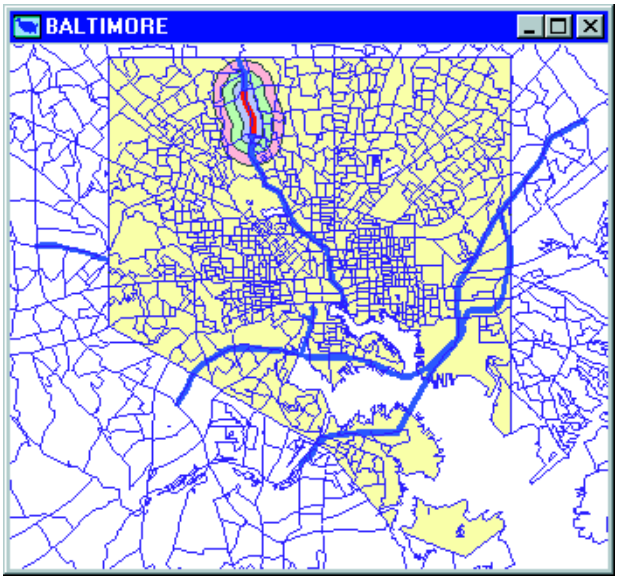
the file in the my-data subdirectory on the c:\ drive. Click OK. The map will be redrawn and the layer with the three bands will be visible.

5. To rename the layer that contains the three bands, **click on the Map layers button**  . Highlight the layer containing the bands, ***click on the Rename button,*** then ***type in a new name, such as "Interstate Highway Bands." Click OK, then click on Close in the Layers dialog box.***

6. To determine population levels based on U.S. Census data for the regions covered by the three bands, you will add a layer to the map that contains census data, such as the Block Groups layer. C2020 will calculate population levels within each band by comparing the geographic regions covered by the block groups and bands. If a band covers the same territory that 20 block groups cover, for example, then C2020 will determine the total population under the band by adding the populations of the 20 block groups.

   If a band cuts through one or more block groups, C2020 will perform calculations based on estimates. If a band cuts through the territory of a certain block group, for example, such that 40 percent of the geographic territory of the block group is inside the band, then C2020 will estimate that 40 percent of the block group's population must also be inside the band. C2020 also uses this estimating procedure for census data elements other than population. Due to this estimating procedure, it is wise to add the Block Group layer to your map because it has the smallest geographic units that contain census data.

   Click on the Map Layers tool  and then **click on the Add Layer button.** The **File Open** dialog box appears. You need to add the layer that contains block groups on the CD-ROM, so select the appropriate computer drive and then ***select the file ccbg.cdf. Click OK.*** This layer will be added to your map and you will return to the Layers dialog box. ***Click on Close.*** Your map will be redrawn and should look like the one below.



Creating an Overlay

7. Now you will use the **Overlay tool** to analyze data within the portions of block groups that lie under the bands. To do this, ***make Interstate Highway Bands the working layer,*** then **click on the Overlay tool**. The Geographic Overlay dialog box appears, as illustrated below. To create a selection set of block groups that lie underneath the three bands, **make the following selections in the Geographic Overlay dialog box:**

C2020 will generate statistical data based on its comparison of the geographic territories shared by the three bands and certain block groups. (The Save As dialog box appears which asks for a file name to store the data it generated. Choose a name and store the file in the my-data subdirectory.)

8. C2020 generates a dataview that shows the statistics relevant to each of the three bands. Band 1 will be the band closest to the selected interstate highway segment. Scroll through the dataview and you will find the population and income information relevant to the areas within the three bands. When finished, ***click on File, Close All,*** from the Main Menu, and **save only the map of the city of Baltimore.**

Chapter 4 Summary Questions

1. True or False: The Info tool is the easiest way to view census data associated with the working layer of a map. All you need to do is click once on the Info tool to activate it and then once on the area that you want information for.
2. True or False: You can use the Map Editing tools to add and remove areas, lines, and points from any layer on your map.
3. True or False: When trimming a census area, the software assumes homogeneity throughout the area. For example, if you cut one-quarter off a census tract containing 500 people, the software would divide the tract into one small area containing 125 people and one large area containing 375 people.
4. What are two methods for creating a new layer?
   A. Tools, Export, from the Main Menu.
   B. File, New, from the Main Menu.
   C. Window, New Layout, from the Main Menu.
   D. Tools, Add Ins, from the Main Menu.
5. True or False: The Map Library can be used as a way to file and organize your own maps.

Answers to these questions can be found at the end of the manual in Appendix B.